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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/771,089

02/03/2004

Young-Kai Chen

33-5-3

1951

7590

01/21/2005

Thomas Stafford  
4173 Rotherham Court  
Palm Harbor, FL 34685

EXAMINER

WILLIAMS, HOWARD L

ART UNIT

PAPER NUMBER

2819

DATE MAILED: 01/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/771,089	<b>Applicant(s)</b> CHEN ET AL.	
	<b>Examiner</b> Howard L. Williams	<b>Art Unit</b> 2819	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 12 is/are rejected.
- 7) ☐ Claim(s) 9-11, 13-15 and 16-20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>02032004</u> . | 6) <input type="checkbox"/> Other: ____.  |

The drawings are objected to because they are poor quality, unfit for reproduction. Copy machine marks obscure some elements (figs. 1-3) and render one box completely illegible (fig. 3). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The examiner acknowledges receipt of an Information Disclosure Statement on 03 February 2004. An initialed copy of the citation form should accompany this office action.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 and 12 rejected under 35 U.S.C. 103(a) as unpatentable over Yacoubian et al. article (Digital-to-Analog Conversion Using Electrooptic Modulators). Yacoubian et al. disclose a digital-to-analog converter using Mach-Zehnder modulators (MZMs) (fig. 1). Yacoubian utilizes a continuous wave laser (page 117, col. 2, section

III, line 2) and also a pulsed laser (page 118, left column, line 17) in a second demonstration. The input splits into the various optical paths of the MZMs (fig. 1) -- multiple paths ( $1, 2, 4, 8, \dots 2^N$ ) and the digital bits are applied to the MZMs (fig. 1) and influenced by the electro-optic effect of the MZMs. The modulated light signals are combined at the output of the modulators and added incoherently (page 117, right column, lines 16-18). Yacoubian et al. do not explicitly state that the phase of the lasers in the various modulators is shifted; however, Yacoubian does refer to the incoherent addition of the respective light addition and utilizes a Mach-Zehnder modulator, the same type modulator disclosed in the present application. Papuchon et al also discloses a DAC using electro-optic modulators produces a phase shift proportional to the applied voltage. Accordingly it would have been obvious to one of ordinary skill that the incoherent addition in Yacoubian is the addition of the phase-shifted optical signals.

Yacoubian and Papuchon do not disclose the source of the binary signals as a memory. Yacoubian illustrates the input wires but it would have been obvious the signals conducted arrive from somewhere. Papuchon discloses binary signals originating from a "modulating source" (6; fig. 5) but does not specify this as a memory. Hong discloses in col. 4, lines 36-46 discloses the use of a high-speed memory to drive the optical D/A. It would have been obvious from Hong to use a memory to hold the digital bits used to modulate the optical signals because it is necessary to have a sequence of signals corresponding to the desired waveform ready and available to apply to the MZM of Yacoubian or Papuchon.

Claims 9-11, 13-15 and 16-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The art of record does not show the specific equation for the photodiode current or the cascading of several modulators.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lewis et al. (US 6661361 B1) and Kawaguchi et al. (JP 57092320 A) disclose optical D-A converters, Newberg et al. (US 6175672 B1) discloses one equation for photodiode current, Gnauck et al. (US 5303079 A) discloses


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an optical transmission system where the optical signal is modulated by a digital input, and Verber (US 4613204 A) disclose a SAW based optical DAC.

Any inquiry concerning this communication should be directed to Howard L. Williams at telephone number 571.272.1815. The Patent and Trademark Office has a new central facsimile number for application specific correspondence intended for entry, it is 703-872-9306.

1/19/05  
Voice 571.272.1815

  
Howard L. Williams  
Primary Examiner  
Art Unit 2819